

What is claimed:

1 1. A method for manufacturing a die used for
2 fabricating by injection molding a lens plate carrying
3 convex lenslets each having a spherical or aspherical end
4 surface arranged in a regular pattern on its surface
5 comprising the steps of:

6 obtaining a mother matrix by arranging spherically
7 convex resin lenslets in a regular pattern on a planar
8 substrate, and processing, for each spherically convex
9 lenslet of the mother matrix, the periphery of a circle
10 which has the center essentially corresponding with the
11 center of the lenslet;

12 forming a conductive film over the resin of the mother
13 matrix thus processed;

14 plating a metal to form a metal plating having a
15 specified thickness on the conductive film; and

16 obtaining a die by parting the metal plating from the
17 mother matrix.

1 2. A method for manufacturing a die as described in
2 Claim 1 wherein each convex lenslet has a quadrangular or
3 hexagonal contour in a plan view of the plate, and the
4 lenslets are arranged such that the direction in which the
5 center-to-center distance between adjacent lenslets takes a
6 maximum value is in parallel with the lengthwise side of
7 the plate.

1 3. A method for manufacturing a die used for
2 fabricating by injection molding a lens plate carrying

3 convex lenslets each having a spherical or aspherical end
4 surface arranged in a regular pattern in its surface
5 comprising the steps of:

6 obtaining a mother matrix by arranging spherically
7 convex resin lenslets in a regular pattern on a planar
8 substrate, and forming a groove or a ridge along the
9 bisector of a center-to-center line drawn between each pair
10 of adjacent spherically convex lenslets;

11 forming a conductive film over the resin of the mother
12 matrix which had grooves or ridges formed on its surface;

13 plating a metal to form a metal plating having a
14 specified thickness on the conductive film; and

15 obtaining a die by parting the metal plating from the
16 mother matrix.

1 4. A method for manufacturing a die as described in
2 Claim 3 wherein each convex lenslet has a quadrangular or
3 hexagonal contour in a plan view of the plate, and the
4 lenslets are arranged such that the direction in which the
5 center-to-center distance between adjacent lenslets takes a
6 maximum value is in parallel with the lengthwise side of
7 the plate.

1 5. A method for manufacturing a die as described in
2 Claim 2 or 3 wherein the convex lenslets are densely packed.

1 6. A method for manufacturing a die as described in
2 Claim 2 or 3 wherein the processing is achieved by using a
3 laser beam.

1 7. A method for fabricating a resin lens plate
2 comprising the steps of: preparing a die manufactured by
3 the method as described in Claim 2 and an unprocessed die,
4 combining the dies such that the concavities thereon face
5 each other, and mounting the dies to respective die-sets;

6 introducing a gap having a specified width between the
7 two apposed dies, and injecting a resin through the gap;

8 parting the two dies and removing a resin lens plate;
9 and

10 forming, for each convex lenslet formed on the resin lens
11 plate, a light absorbing film over the processed parts
12 outside the periphery of a circle which has the center
13 essentially corresponding with the center of the lenslet.

1 8. A method for fabricating a resin lens plate
2 comprising the steps of:

3 preparing a die manufactured by the method as
4 described in Claim 2 and a flat die having no concavities
5 on its surface, combining the dies such that the concavity
6 carrying surface of the former faces the flat surface of
7 the latter, and mounting the dies to respective die-sets;

8 introducing a gap having a specified width between the
9 two apposed dies, and injecting a resin through the gap;

10 parting the two dies and removing a resin lens plate;
11 and

12 forming, for each convex lenslet formed on the resin
13 lens plate, a light absorbing film over the processed parts

14 outside the periphery of a circle which has the center
15 essentially corresponding with the center of the lenslet.

1 9. A method for fabricating a resin lens plate
2 comprising the steps of:

3 preparing a die manufactured by the method as
4 described in Claim 4 and an unprocessed die, combining the
5 dies such that the concavities thereon face each other, and
6 mounting the dies to respective die-sets;

7 introducing a gap having specified width between the
8 two apposed dies, and injecting a resin through the gap;

9 parting the two dies and removing a resin lens plate;
10 and

11 forming a light absorbing film over a groove or a
12 ridge formed between each pair of adjacent convex lenslets
13 on the resin lens plate.

1 10. A method for fabricating a resin lens plate
2 comprising the steps of:

3 preparing a die manufactured by the method as
4 described in Claim 4 and a flat die having no concavities
5 on its surface, combining the dies such that the concavity
6 carrying on its surface of the former faces the flat
7 surface of the latter, and mounting the dies to respective
8 die-sets;

9 introducing a gap having a specified width between the
10 two opposed dies, and injecting a resin through the gap;

11 parting the two dies and removing a resin lens plate;
12 and

13 forming a light absorbing film over a groove or a
14 ridge formed between each pair of adjacent convex lenslets
15 on the resin lens plates.

1 11. A method for fabricating a resin lens plate
2 comprising the steps of:

3 preparing two dies manufactured by the method as
4 described in Claim 4, combining the dies such that the
5 concavity carrying surfaces of the dies face each other,
6 and mounting the dies to respective die-sets;

7 introducing a gap having a specified width between the
8 two apposed dies, and injecting a resin through the gap;

9 parting the two dies and removing a resin lens plate;
10 and

11 forming a light absorbing film over a groove or a
12 ridge formed between each pair of adjacent convex lenslets
13 on the resin lens plate.

1 12. A method for fabricating an erect image resin
2 lens array comprising stacking two or more resin lens
3 plates containing at least one resin lens plate prepared by
4 a method as described in any one of the Claims 7 to 11.